

## Workshop report

# Understanding Biodiversity Changes and Causes – Synergies in Arctic Terrestrial Biodiversity Research and Monitoring



12 October 2011  
Sonnerupgaard Gods, Hvalsø, Denmark.



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## Acronyms

ABC	Arctic Biodiversity Coalition
AERA	Arctic Ecosystem Resilience Assessment
AMAP	Arctic Monitoring and Assessment Programme
BTF	Back To the Future
CAFF	Conservation of Arctic Flora and Fauna
CBMP TEMG	Circumpolar Biodiversity Monitoring Programme – Terrestrial Expert Monitoring Group
IASC TWG	International Arctic Science Committee – Terrestrial Working Group
INTERACT	International Network for Terrestrial Research and Monitoring in the Arctic
IPY	International Polar Year
ISAC	International Study of Arctic Change
ITEX	International Tundra Experiment
GEM	Greenland Ecosystem Monitoring
MoU	Memorandum of Understanding
MOMA	Monitoring Matters Network
NGO	Non-Governmental Organisation
NORDECO	Nordic Agency for Development and Ecology
SAON	Sustaining Arctic Observing Network
WWF	World Wildlife Fund for Nature

## Background

The need to measure and understand change in Arctic biodiversity is increasing given the evidence that Arctic ecosystems are already rapidly responding, in some cases quite dramatically, to climatic changes. Substantial shifts in the Arctic environment are predicted for the near future (e.g. encroachment of more southerly species and ecosystems) and recent changes in physical processes such as sea ice loss have outpaced predicted changes. Limited functional redundancy in Arctic ecosystems poses a particular risk as the loss of a single species could have dramatic and cascading effects on an ecosystem's state and function.

Based on these change scenarios the Arctic has experienced a dramatic increase in research and monitoring activities both in terms of scientific disciplines and geographical coverage. International, regional, national and local actors have initiated projects and programmes, to improve our ability to detect changes that allow us to deal with some of the challenging issues that the biodiversity of the Arctic is facing today. There are however still gaps in our knowledge and capacity to fully understand and monitor changes in biodiversity and to predict the impacts of a changing climate as well as natural and human induced stressors.

There is some coordination between some biodiversity related projects and programmes in the Arctic, but there is still overlap between different initiatives and possibilities for improved coordination and sharing of knowledge and experiences. There is therefore a need to combine resources and jointly work together to improve our understanding of Arctic terrestrial biodiversity and ecosystem processes, status and trends and to disseminate the relevant information in both the public and policy arena.

A workshop on “Understanding Biodiversity Changes and Causes – Synergies in Arctic Terrestrial Biodiversity Research and Monitoring” was held 12 October 2011 at Sonnerupgaard Gods in Denmark. This workshop was organized jointly by INTERACT, The Circumpolar Biodiversity Monitoring Programme's Terrestrial Expert Monitoring Group (CBMP TEMG) and the International Arctic Science Committee's Terrestrial Working Group (ISAC TWG).

The workshop was funded by the organising organisations with support from the Nordic Council of Ministers.

## Purpose and programme of the workshop

Several international organisations and networks work with Arctic ecosystems and biodiversity research and monitoring. Some main stakeholders such as the two monitoring programmes under *Arctic Council*, *Circumpolar Biodiversity Monitoring Programme* (under CAFF) and the *Arctic Monitoring and Assessment Programme* (AMAP) focus on the status and trends of biodiversity/ecosystems and their drivers. Others such as the International Study of Arctic Change (ISAC) and International Arctic Science Committee (IASC) focus on the understanding of the processes driving the systems and their organisms. Some existing research networks already employ consistent, repeatable and standardized measures also in relation to biodiversity monitoring. The INTERACT network of circumpolar field stations host a number of these networks, and thus contributes to major environmental assessments based on site based monitoring and research. This infrastructure network is therefore a key platform for Arctic ecosystem and biodiversity research and monitoring. Furthermore, INTERACT sites host and initiate summer schools that could help build capacity for field identification of difficult taxa and sampling.

The overall goal of the workshop was to identify possible synergies between organisations and networks working with Arctic terrestrial biodiversity, and to agree on common actions to improve the collaboration and communication (see appendix 1 and 2 for further information about agenda and participants).

To reach the goal, the participants were provided with an overview of stakeholders in Arctic Terrestrial Biodiversity Research and Monitoring, including decision makers, the science community, Indigenous Peoples Organisation, and NGOs.

The following presentations were given:

Setting the scene

- Terry V. Callaghan - Setting the scene and expected outputs
- Hans Meltofte - Arctic Biodiversity Assessment (key speaker)

Stakeholders

- Inge Thaulow - Government of Greenland, National Authority of Arctic Council member state
- Anne Brunk - Indigenous Peoples Organisation
- Martin Sommerkorn - NGO representative - WWF

Inspirational presentations

- Terry V. Callaghan - International Tundra Experiment (ITEX) / Back to the Future (BTF) – examples of circumarctic research and monitoring programmes
- Finn Danielsen - Community-based monitoring - Opening doors to native knowledge
- Morten Rasch - Greenland Ecosystem Monitoring (GEM) - Designing an ecosystem/Site based research and monitoring programme
- Bob Shuchman - Remote sensing
- Skip Walker - Scaling

Major Arctic initiatives related to biodiversity research and monitoring

- Mike Gill - CAFF/CBMP Terrestrial Expert Monitoring Group
- Margareta Johansson - INTERACT
- Skip Walker - IASC Terrestrial Working Group
- Gus Shaver - ISAC
- Jesper Madsen - SAON

Presentations from the workshop can be found on the INTERACT website: <http://www.eu-interact.org/station-managers-forum/meetings/international-workshop/>.

After each presentation, time was set aside for brief discussions where participants were asked to focus on the following points:

- Map the opportunities for collaboration within the field of Arctic terrestrial biodiversity
- Identify knowledge gaps and capacity constraints
- Produce a list of recommended activities and
- Identify topics with potential for collaboration within the field of biodiversity research and monitoring including identification of relevant stakeholders.

The Synergy Group

A Synergy Group consisting of representatives of the major initiatives related to monitoring and research of Arctic terrestrial biodiversity, was asked to identify gaps, synergies and areas of potential collaboration and to produce a report based on the workshop (see *Synergy Group Conclusions and Recommendations*). After presentations and discussions, the Synergy Group had time to prepare a conclusion and draft recommendations for a final plenary discussion. The Synergy Group consisted of:

Jesper Madsen, Aarhus University, Denmark (CBMP)

Terry Callaghan, Royal Swedish Academy of Science and University of Sheffield (INTERACT and IASC)

John Payne, North Slope Science Initiative, USA (CBMP)

Gus Shaver, Ecosystem Centre Massachusetts, USA (ISAC)

Mike Gill, CBMP-office, Canada (CBMP)

Mads C. Forchhammer, Aarhus University, Denmark (IASC)

## Synergy Group conclusions and recommendations

This section presents the recommendations and conclusions finalised by the Synergy Group after the workshop:

The goal of the workshop was to identify possible synergies between organisations and networks working with Arctic terrestrial biodiversity and to agree on common actions to improve the collaboration and communication.

Several international organisations and networks work with Arctic ecosystems and biodiversity research and monitoring. Some organisations focus on the status and trends of biodiversity/ecosystems and their drivers, while others focus on the understanding of the processes driving the systems and their organisms. However, they all share the common goal of improving our understanding about what causes the observed changes and what impacts the multiple natural and human-induced drivers of change will have on terrestrial biodiversity and ecosystem functioning. The various organisations and networks also share an interest in the dissemination of timely and science-based advice to the Arctic people and political-administrative systems about causes and consequences of changes in support of possible adaptation and mitigation strategies.

The endeavour to fully understand biodiversity changes and underlying causes is challenged with incomplete knowledge, ranging from limited spatial and temporal observational coverage, small skill pools (e.g. taxonomic), slow take-up of new technologies, lack of coordination and harmonisation of sampling protocols over understanding system responses, species invasiveness and effects of extreme events to predictive capabilities and lack of concepts on how to preserve and manage biodiversity. None of the organisations have the capacity to fill these gaps on their own, but by working together, the actors can at least fill some of the critical gaps. Provided that there is a willingness to buy-in, collaborate and communicate, there is much synergy to be gained by setting up a **coalition** between the partners.

When seeking to identify areas of potential collaboration, the Synergy Group wanted to focus on obvious areas for collaboration within ongoing activities and joint efforts to fill important knowledge gaps to ensure that the collaboration is initiated with realistic achievable targets.

The following actions were discussed at the workshop:

### **A) Mechanism for communication and collaboration: Arctic Biodiversity Coalition - Terrestrial**

It was agreed that organisations and networks should work together via a Memorandum of Understanding (MoU) and not create a new administrative unit. The MoU signatories will be partners in the Arctic Biodiversity Coalition – Terrestrial (ABC – Terrestrial) within which an informal forum will be established to:

- Inform about activities
- Make joint activities
- Avoid duplication of efforts
- Evaluate causalities
- Make joint outreach campaigns and deliver fast products to decision makers
- Develop ways of involving local communities in biodiversity research and monitoring

The members of the Synergy Group will in the nearest future form a basis for post-meeting formulation of an agreed mechanism for communicating and refining proposed joint actions. The members of the Synergy Group will continue to discuss:

- Who are the partners of the ABC – Terrestrial? (see figure 1)
- How the partners within ABC - Terrestrial should communicate (frequency and form) to ensure regular updates on joint activities and identify new synergies and proposed actions
- A refinement of proposed joint actions and identification of future synergies

Based on this a Memorandum of Understanding should be developed by the Synergy Group and distributed to relevant organisations and networks.

## B) Synergies in ongoing activities

### Synergy 1

Activity:	Terrestrial Biodiversity Monitoring Plan
Lead organisations:	Circumpolar Biodiversity Monitoring Programme (CBMP), Arctic Council/CAFF
Description:	<p>The CBMP Terrestrial Expert Monitoring Group (TEMG) is developing a monitoring plan for Arctic terrestrial biodiversity. In order to identify indicators it is essential to understand the processes shaping Arctic biodiversity and ecosystems. INTERACT provides a unique network of field stations in the Arctic that could act as a site based component of the CBMP TEMG biodiversity monitoring plan. Therefore, CBMP TEMG will involve relevant organisations and networks in the development of the plan.</p> <p>The CBMP biodiversity monitoring plan also includes a community-based monitoring component. Similarly, the INTERACT project also includes a component on involvement of local communities in monitoring and discussion of changes and adaptation strategies. CBMP TEMG and INTERACT should therefore explore opportunities to coordinate the programmes and jointly develop community-based monitoring.</p>
Partners:	CAFF/CBMP, INTERACT, others to be identified.

### Synergy 2

Activity:	IPY Back to the Future project (BTF 2) – revisiting old assessment sites to assess change
Lead organisations:	INTERACT, CBMP
Description:	<p>The core work of the IPY - Back to the Future (BTF) project was to identify old datasets/research sites and repeat the old assessments to quantify change. More specifically :</p> <ul style="list-style-type: none"><li>a) To assess multi-decadal past changes in the structure and function of polar terrestrial and freshwater ecosystems and environments in relation to diverse drivers of change.</li><li>b) To assess the current status of polar ecosystems and their biodiversity.</li><li>c) To permanently record precise locations of old sites.</li></ul> <p>BTF 1 has been very successful: many papers have been published and a special issue of the international science journal “Ambio” was published at the end of last year. Partners of BTF 2 are interested in ensuring that additional old assessment sites and data are identified, stored and used to assess changes and ensure the IPY legacy. At the workshop, it was therefore decided to look at possibilities for hosting the project within one of the ABC – Terrestrial partner organisations or networks.</p>
Partners:	INTERACT, CBMP, others to be identified.

## C) Recommended new actions

### Action 1

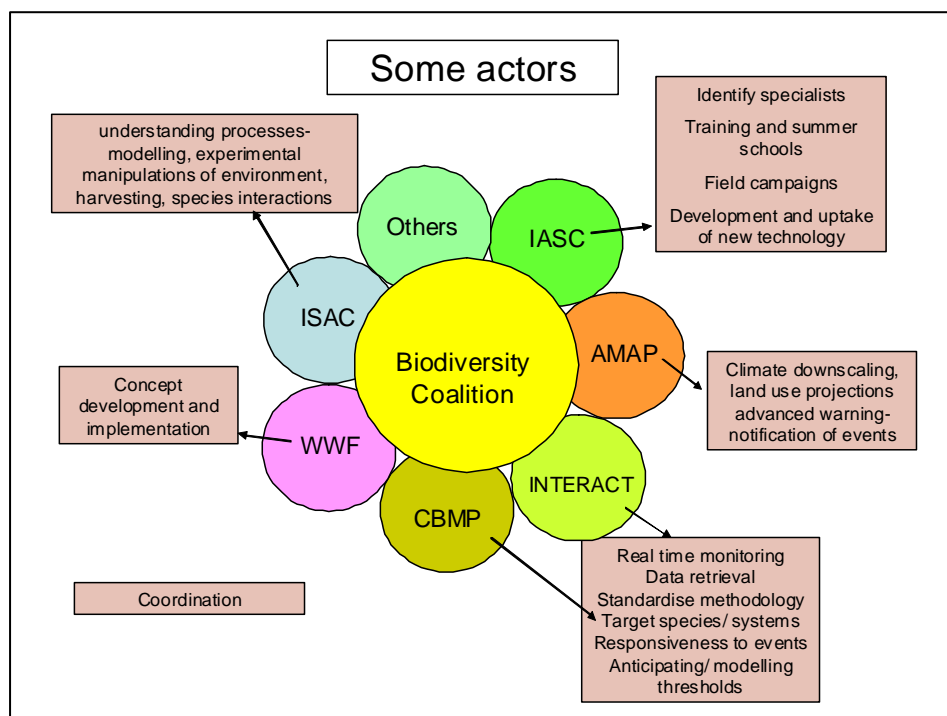
Activity:	Joint efforts to develop training/ courses/education.
Lead organisation:	IASC, INTERACT.
Description:	Capacity building is needed within a number of scientific fields. A priority in this context is taxonomy and early career scientists. It is therefore proposed that ABC – Terrestrial partners arrange common practical taxonomy training courses and capacity building of young scientists via summer schools.
Partners:	IASC, ISAC, CBMP, INTERACT, others to be identified.

### Action 2

Activity:	Joint workshops to increase understanding of biodiversity changes and causes
Lead organisation:	Synergy Group Members
Description:	<p>In order to fill in some of the gaps in our knowledge and understanding of factors shaping Arctic biodiversity and ecosystem functioning, there is a need to bring experts together. Therefore, it is proposed that the ABC – Terrestrial partners jointly arrange workshops with specific scientific scopes. The Synergy Group proposed the following activities as a starting point:</p> <ul style="list-style-type: none"><li>- Joint workshop on fundamental biodiversity concepts</li><li>- Joint workshop on ecosystem resilience/thresholds</li><li>- Joint workshop on species redistribution/dispersal capabilities</li></ul>
Partners:	Synergy Group members, WWF (resilience), others to be identified.

## D) Other areas of potential collaboration noted by the Synergy Group during presentations and discussions

- Standardisation of methodologies.
- Categorisation and definition of biodiversity components; e.g. develop standardised approaches for describing and mapping vegetation and plant communities at multiple scales.
- Develop ideas for joint efforts to inform decision makers and provide rapid response to acute information needs.



**Figure 1.** Key partners in the Arctic Biodiversity Coalition - Terrestrial and their possible focal areas.

## Immediate post-workshop developments

### 1. ABC

ABC - Terrestrial was immediately proposed by CBMP, IASC and INTERACT as a task within SAON. The proposal was discussed at a recent meeting of the SAON Board and the outcome is pending. Membership is currently being discussed by several organisations such as ISAC and ITEX.

### 2. BTF 2

INTERACT has accepted the task to coordinate BTF 2 and will collaborate closely with the CBMP TEG. INTERACT and CBMP TEG now needs to discuss operational aspects. Leaders of BTF 1 (Terry Callaghan and Craig Tweedie) agree to this development and continue to contribute to a leading role in a new organisational context.

### 3. Project on Ecosystem Resilience

Following recommendations from the workshop, a project led by Jesper Madsen and Mads C. Forchhammer, Aarhus University, Denmark has been proposed with the aim to provide the first Arctic Ecosystem Resilience Assessment (AERA) across terrestrial, limnic and marine ecosystems in the Arctic. A circumpolar workshop will be held, with the aim to produce an assessment report, a series of scientific papers and a policy-guiding document on the resilience of Arctic species and ecosystems. Applications for funding have been sent to The Nordic Ministers Council and Danish funding agencies (response awaited in March 2012). This is a joint project between ABC - Terrestrial partners.





**Workshop**  
**“Understanding Biodiversity Changes and Causes**  
**- Synergies in Arctic Terrestrial Biodiversity Research and Monitoring”**

**Sonnerupgaard Gods, Hvalsø, Denmark**  
**12 October 2011**

**Purpose**

The purpose of the joint workshop is:

- to provide participants with an overview of stakeholders in Arctic Terrestrial Biodiversity Research and Monitoring, including decision makers, science community, Indigenous Peoples Organisation and NGOs.
- to ensure that workshop participants have a clear and full understanding of programme goals and outputs of Arctic Council initiatives (SAON, CBMP-Terrestrial Expert Monitoring Group, AMAP), IASC Terrestrial Working Group, ISAC and INTERACT, and opportunities for collaboration within the field of biodiversity.
- to identify knowledge gaps and capacity constraints, and produce a list of recommended activities and topics with potential for collaboration within the field of biodiversity research and monitoring including identification of relevant participants.

**Output**

A report presenting gaps and recommended collaborative actions in relation to biodiversity research and monitoring in the Arctic. The report will describe gaps and recommended activities that will help fill the gaps and improve our understanding of biodiversity changes and causes. The report will also include an initial list of networks, organisations, programmes and projects that are interested in participating in suggested activities (e.g. in the form joint research and monitoring efforts, developing courses and training programmes, joint workshops or reports on specific topics, etc.).

**Agenda**

- 08.30 Welcome, agenda and practicalities (Elmer Topp Jørgensen, INTERACT, Tom Christensen, CBMP)
- 08.35 Setting the scene and expected outputs (Terry V. Callaghan INTERACT /IASC TWG)
- 08.50 Key note speaker 1: Arctic Biodiversity Assessment (Hans Møltefte, Aarhus University)

**Session 1: Stakeholders in Arctic Biodiversity**

- 09.15 National Authority of Arctic Council member state (Inge Thaulow, Greenland/Denmark)
- 09.30 Indigenous Peoples Organisation (Anna Brunk, Indigenous Peoples Secretariat)
- 09.45 NGO representative (Martin Sommerkorn, WWF)

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**10.00-10.25 Coffee**

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**Session 2: Inspirational presentations**

- 10.25 Introduction to session 2 (Chair Margareta Johansson, INTERACT)

## Appendix 1

10.30 International Tundra Experiment (ITEX)/ Back to the Future (BTF) - Circumarctic research and monitoring programmes (Terry V. Callaghan)  
10.50 Community-based monitoring - Opening doors to native knowledge (Finn Danielsen, MOMA/Nordeco)  
11.10 Greenland Ecosystem Monitoring (GEM) - Designing a ecosystem/site based research and monitoring programme (Morten Rasch)  
11.30 Remote sensing (Bob Shuchman)  
11.45 Scaling (Skip Walker)

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### 12.00-13.00 Lunch

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#### Session 3: Circumarctic Terrestrial Biodiversity Research and Monitoring initiatives

13.00 Introduction to session 3 (Chair John Payne, CBMP TEMG)  
13.05 CAFF/CBMP Terrestrial Expert Monitoring Group (Mike Gill)  
13.40 INTERACT (Margareta Johansson)

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### 14.15-14.45 Coffee

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14.45 IASC Terrestrial Working Group (Skip Walker)  
15.20 ISAC (Gus Shaver)  
15.55 SAON (Jesper Madsen)

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### 16.15-17.15 Break (except for Synergies Group members)

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#### 16.15-17.15 Synergy Group meeting (Synergy Group members only)

The Synergy Group consists of representatives of major initiatives within the field of Arctic Biodiversity. The Group discuss and identifies gaps and areas of potential collaboration based on workshop presentations and discussions. These are presented theme by theme immediately hereafter.

#### Session 4: Identification of gaps, recommended activities and potential synergies

17.15 – 18.45 Synergy Group presentation of gaps, recommended activities and areas of potential collaboration, followed by plenum discussion

18.45 Concluding reflections by the Synergy Group

19.00 Closing remarks and the way ahead – the process of turning gaps and areas of collaboration into synergy action (Mike Gill and Terry Callaghan)

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### 19.30 Dinner

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## Workshop: Understanding Biodiversity Changes and Causes

### – Synergies in Arctic Terrestrial Biodiversity Research and Monitoring



Sonnerupgaard Gods, Hvalsø Denmark, 12 October 2011

## List of Participants

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